
HOUSEHOLD AND NATIONAL FOOD SECURITY IN SOUTHERN AFRICA



Edited by

Godfrey D. Mudimu & Richard H. Bernstein

University of Zimbabwe UZ/MSU Food Research in Southern Africa

HOUSEHOLD AND NATIONAL FOOD SECURITY IN SOUTHERN AFRICA

Edited by
Godfrey Mudimu
Richard H. Bernstein

UZ/MSU Food Security Research in Southern Africa Project
Department of Agricultural Economics and Extension
University of Zimbabwe
P.O. Box MP 167,
Harare, Zimbabwe
Telex 4152 ZW
Telephone 303211 Extension 1516

SECTION 3: FOOD SECURITY POLICY OPTIONS

GRAIN RETENTIONS AND CONSUMPTION BEHAVIOUR AMONG RURAL ZIMBABWE HOUSEHOLDS J. Stanning	79
PAN-TERRITORIAL AND PAN-SEASONAL PRICING FOR MAIZE IN ZIMBABWE K. Muir and T. Takavarasha	103
SMALL GRAIN MARKETS IN ZIMBABWE: THE FOOD SECURITY IMPLICATIONS OF NATIONAL MARKET POLICY C. Mbwanda and D. Rohrbach	125
SELECTED RESEARCH FINDINGS FROM RWANDA THAT INFORM POLICY THEMES IN SOUTHERN AFRICA S. Loveridge, S. Rwamasirabo, and M.T. Weber	146

SECTION 4: NEW TECHNOLOGY TO IMPROVE HOUSEHOLD FOOD SECURITY

RESEARCH ON GRAIN LEGUMES IN SADCC COUNTRIES D. Naik	169
BIOTECHNOLOGY: ITS POTENTIAL IMPACT ON FOOD SECURITY IN SOUTHERN AFRICA I. Robertson	185

SECTION 5: FAMILY FOOD SECURITY STRATEGIES IN LOW RAINFALL AREAS

FAMILY INCOME SOURCE AND FOOD SECURITY C. Chopak	193
--	-----

FOREWORD

In 1985 the University of Zimbabwe and Michigan State University initiated a Food Security Research Network for Southern Africa. The objectives of the network are to conduct research that informs policymakers about food security issues and to help strengthen the regional capacity for food policy analysis. The underlying premise of the network is that building excellence in research capacity for national policy analysis comes through experience. In practice, this requires a long-term commitment to analytical capacity building, consistency in funding, and constant interaction between researchers and policymakers.

The network has sponsored four annual conferences for network researchers, policymakers, SADCC officials, and representative of international and donor agencies. The aim of the conference is to share research findings, identify new research themes, and provide an opportunity for policy dialogue between regional researchers, policymakers, and government officials.

The 1988 conference brought together 110 participants who deliberated on 28 papers. In the Official Opening, Vice-Chancellor W.J. Kamba of the University of Zimbabwe highlighted the importance of including health related-issues as a component of food security; and Zimbabwe's Senior Minister of Finance, Economic Planning, and Development B.T.G. Chidzero outlined policy reform priorities for Southern Africa. Subsequent sessions focused on *SADCC's Food Security Programme, the Impact of Market Reform on Food Security, Food Security Policy Options, New Technology to Improve Food Security, Family Food Security Options in Low-Rainfall Areas, Expanding Agricultural Trade in the SADCC Region, Nutrition and Food Security, the Contribution of Small-Scale Rural Enterprises to Employment Generation and Food Security, and the Impact of Irrigation on Food Security.*

A highlight of the 1988 conference was the participation of five nutritionists from Zambia, Zimbabwe, Sweden, and the United States. The presence of the nutritionists stimulated formal and informal discussions on the food access side of the food security equation and drew attention to the need to initiate more research in this area.

A second highlight of the 1988 conference was the attention given to reducing barriers to expanded intraregional trade in the SADCC region. Results presented suggest that there appear to be substantial price and nonprice barriers to expanded trade. Nevertheless, there exist significant opportunities for expanding intraregional trade that can be realized through appropriate government initiatives.

This proceeding contains revised papers prepared under the sponsorship of the University of Zimbabwe/Michigan State University Food Security Research Project in Southern Africa and presented at the University of Zimbabwe's Fourth Annual Conference on Food Security Research in Southern Africa, held at the Holiday Inn, Harare, October 31-November 3, 1988.

Godfrey Mudimu and Richard H. Bernstein
Co-Directors
UZ/MSU Food Security Research Project
University of Zimbabwe

PAN-TERRITORIAL AND PAN-SEASONAL PRICING FOR MAIZE IN ZIMBABWE

Kay Muir and Tobias Takavarasha¹

INTRODUCTION

Agricultural prices are seldom left to the market mechanism, regardless of the political system or level of development. This intervention in the price which would be established by unfettered supply and demand is motivated by more than existing market imperfections. The biological nature of the agricultural production process is a major factor in government intervention. Actual and planned supply are rarely the same; there are significant lags between the planning of production and the eventual supply of the commodity. Prices are unstable both within and between seasons and may involve cycles which move away from, rather than towards equilibrium--even under conditions of perfect competition. The situation is aggravated by the fact that because most agricultural commodities are necessities, they have a relatively inelastic demand. This means that fluctuations in supply will result in more than proportionate fluctuations in price. Much of the intervention is thus aimed at stabilising domestic supplies and prices. Food security, income redistribution, and reallocation of resources are other major objectives.

Government intervention in agricultural pricing can essentially be categorised either as consumer or producer oriented. In the former, the objective is to keep food prices down, and in this way agriculture is 'taxed' and resources are transferred to other sectors--which has happened in many developing countries. In the latter, prices are raised to increase farm incomes. This broadly is the position in the European Community, where a battery of supports keeps agricultural producer prices well above their market levels. These distortions have a major impact on world prices, which in turn affect price determination in developing countries.

The national development objectives of the Zimbabwe government are laid out in a number of policy documents. "The central objectives are to foster rapid economic growth, full employment, dynamic efficiency in resource allocation, and an equitable distribution of the ensuing benefits" (Zimbabwe, 1981, p.1). Government is in the process of complying with the provision in the *Transitional National Development Plan* to undertake a comprehensive examination and review of agricultural pricing with a view to developing a pricing policy which effectively and equitably promotes growth, development of the communal areas, food self-sufficiency, regional security, and efficient land use and development. Conflicts are inherent in some of these objectives and it is the role of the policy analyst to determine the trade-offs.

Zimbabwe has very high bridging costs to and from international markets and regional markets for maize are limited. Maize is the staple food and the most

¹Department of Agricultural Economics and Extension, University of Zimbabwe and Chief Agricultural Economist, Ministry of Lands, Agriculture and Rural Resettlement, Harare, respectively.

widely-grown crop. The extreme variability of maize yields and the very high differential between export and import parity mean that free market conditions would result in unacceptably high market risks for producers and unacceptable price fluctuations for consumers. Any government intervention to reduce these fluctuations will have associated costs. National buffer stocks, imports, and artificially-determined prices incur trade-offs between conflicting objectives. In order to ensure rational policy decisions, it is essential that the impacts of a particular policy are measured against each major objective.

A REVIEW OF PRICE SETTING POLICY SETTING IN ZIMBABWE

Historical background

Direct government intervention in agricultural marketing was initiated in 1931 in response to the world depression which seriously undermined the financial viability of the maize industry which relied on exports. The Maize Control Board was established to stabilize the industry and relied on local consumers to subsidise producers. The era also saw the commencement of racial discrimination in marketing. Maize from communal lands was only allowed access to the lower-priced export markets (Muir-Leresche, 1984).

Producer prices were fixed according to a basic price agreed between government and the National Farmers Union, with annual adjustments made on the basis of changes in a production cost index. This cost-plus pricing system, together with the introduction of high-yielding maize varieties during the 1950s, culminated in overproduction by the end of that decade with surpluses being sold at a loss. As a result, the pricing agreement was dispensed with in 1962. Since then, maize prices have been adjusted annually by government in consultation with the relevant marketing boards and producer representatives.

By 1970 government prescribed producer prices for maize, groundnuts, sorghum, cotton, wheat, soybeans, coffee, beef, and milk. Sunflowers and millets became controlled crops in 1983 and 1984, respectively. The degree of monopsony control varies. Whilst there is legislated monopsony control on all cotton, the Grain Marketing Board (GMB) has monopsony control between communal areas and in all designated areas outside them (Zone A). In Zone B, the communal areas (and low-output commercial areas), free trade is permitted within the boundaries of each area, but the commodities may not cross zone boundaries. This was established to encourage communal areas to be self-sufficient, but to retain control of all exchanges with the formal sector and urban areas and has effectively limited exchanges between surplus and deficit communal areas, unless they have contiguous boundaries.

The government allocation to agriculture includes financing to cover agricultural marketing board deficits. In many instances, these deficits are the result of low selling prices and are effectively consumer subsidies rather than agricultural supports. However, some of the subsidies do result from various direct and indirect producer price supports and it is to a clearer analysis of these policy interventions that this

paper is directed. The annual marketing board subsidies given in Table 1 are a significant proportion of the total budget allocated to agriculture. In 1982-83 agriculture was allocated 5% of total government expenditure of which subsidies (predominantly for consumers and a few large-scale producers) accounted for over half of this vote—leaving only 2.35% to finance all extension, research, marketing, animal health, tsetse control, and administration of large-scale, small-scale, and communal agriculture (Muir-Leresche, 1984).

Price levels have been established around a number of key objectives which include achieving self-sufficiency and maximising foreign exchange earnings where favorable export markets exist. In the 1970s, cotton and groundnuts were taxed relative to opportunity costs; wheat and soybeans were subsidised. This reflected self-sufficiency objectives, the bias of the large-farm lobby, and cost of production pricing.

Price setting for controlled agricultural commodities in the 1980s has been more complicated than in previous decades. The levels of inflation, distorted exchange rate, and declining terms of trade have made the setting of the 'correct' price levels more difficult. Fluctuations in output due to drought and the financial consequences of these swings in production have further complicated the process of setting price levels (Takavarasha, 1987). Nonetheless, in recent years producer subsidies on wheat and soybeans and taxes on groundnuts and cotton have been reduced, indicating a move towards greater efficiency; although maize price setting continues to vary in a relatively explosive cycle (Muir and Blackie, 1988).

Current price setting

The formal procedure for setting the price levels of major state-controlled agricultural commodities begin with meetings between producer representatives and the Agricultural Marketing Authority (AMA). Budgeted trading accounts and cost

Table 1. Parastatal food marketing boards' annual deficits (Z\$ million), Zimbabwe.

Year	CSC ^a	DMB ^b	GMB ^c	Total	Maize ^d
1981	46.3	18.4	30.7	95.4	20.4
1982	45.3	35.6	58.4	139.3	43.6
1983	45.8	38.6	28.0	112.4	17.0
1984	24.3	46.3	31.5	102.1	42.6
1985	27.7	55.6	52.1	135.4	46.3
Totals	189.4	194.5	200.7	584.6	169.9

^aCold Storage Commission, predominantly beef.

^bDiary Marketing Board.

^cGrain Marketing Board; all food crops including maize, wheat, sorghum, munga, rapoko, groundnuts, soyabeans, sunflowers, and coffee.

^dMaize is included in the GMB total, but is also shown separately because it is the staple food and most widely-produced commodity.

^eHarvest year refers to the 1981-82 marketing year.

Source: Respective marketing boards' annual reports (various years).

of production schedules are submitted to the ministry. After a series of meetings with marketing and producer representatives, the ministry decides on prices to recommend to cabinet. No specific formula or technique is used to set price levels and several interrelated factors are considered. Each factor is weighted according to the type of commodity being considered so that commodities largely produced for export are more closely related to border prices. On the other hand, when determining costs of production for maize, wheat, and soybeans, strategic stockpiles and internal selling prices are usually more important than opportunity costs. The macroeconomic impact of the recommended producer prices are considered by an inter-ministerial working party before cabinet makes a final decision.²

Producer prices are fixed during harvest in April for all commodities (wheat being a winter crop is set preplanting). The rationale for postharvest pricing was to allow prices to vary with rainfall, but this has not been the practice (Chavanduka, 1983; and Muir, 1984). The prices are pan-seasonal and apply from April to the following March for the entire country. They are pan-territorial prices, effective at all designated receiving depots.

IMPACTS OF CURRENT PRICE SETTING

Cost of production approach

In practice, the most influential basis for producer prices has been costs of production, in particular those of the commercial farmers. Farm lobbies have been important and price negotiations have concentrated on establishing which data sets accurately reflect costs. Since independence, however, increasing recognition has been given to opportunity costs.

Economic efficiency is seriously affected whenever prices are established on a cost-plus basis. The signals which are sent to the industry are to maximise yields, regardless of costs. These same signals affect the entire agricultural service industry and in particular, the research divisions. Little or no effort is made to find cost-reducing technologies. Where input prices are also distorted in favour of capital-intensive systems, the effects on economic efficiency (growth) are particularly serious. Little attention is given to the most economically efficient farmers or technologies in accordance with Zimbabwe's comparative advantage. All the emphasis is on maximising yield or, at best, on technical efficiency. There still remains considerable confusion between absolute advantage (environment and skills) and comparative advantage which includes demand and price.

To the extent that farmers are able to control producer prices, they will lobby for, and favour a cost of production price system. From a national perspective, however, it is essential to find an independent basis for judging prices. Yield increases are important, but yield increases at any cost are not necessarily desirable. To the

²See Wright and Takavarasha (forthcoming) and Herbst (1988) for details of the price setting process in Zimbabwe.

extent that a national economy can support inefficient producers³, farmers can continue to rely on a cost of production pricing mechanism. However, when the national economy cannot sustain the support system, attention has to be directed to reducing costs of production rather than relying on increased prices and transport subsidies.

International markets for most agricultural products are seriously distorted by heavy support for the farm communities in most developed countries, especially the EEC. This in turn has not only reduced world prices, but has distorted research priorities to favour yield-maximising over cost-reducing technologies. In order to sustain agriculture in developing countries, it may be necessary to subsidise production relative to the distorted world prices. But with the very limited resources available, it is essential that any implicit or explicit subsidy is targeted to those commodities which will help to maximise growth with equity. These supports should avoid sending signals which favour economically inefficient commodities and technologies. The current policies appear to have negative consequences for both growth and equity, given that officially marketed beef and dairy products are produced by a few large-scale farmers and consumed by employed urban households.

Pan-seasonal pricing

The term *pan-seasonal pricing* is used here to refer to the practice of offering the same price to farmers throughout the season. This section seeks to examine the major issues which must be considered in testing the hypothesis that raising the GMB purchase price at intervals after the harvest period would reduce trading losses by encouraging on-farm storage.

Seasonal production creates the need for a marketing system that can store the product from a short harvest period to the much longer consumption period. Over 90% of the GMB maize intake is normally received in five months, June to October, while sales are evenly distributed throughout the year. The exact timing of maize deliveries will vary from year-to-year depending on seasonal rainfall patterns, conditions at harvest, and availability of transport. An additional factor influencing the timing of sales is the need for ready cash by peasant farmers (Stanning, 1987).

Climatic variations cause agricultural production to follow certain distinct seasonal patterns. Hot, wet conditions are necessary at the planting stage; moisture is essential for pollination; while harvesting is best done under dry, sunny conditions. Seasonality in agricultural production places high premiums on the timely performance of critical tasks such as ploughing, planting, cultivation, and harvesting. Significant labour bottlenecks usually occur if certain tasks must be performed very quickly at specific times to ensure maximum yields (e.g., weeding). Marketing agencies must similarly plan their operations in such a way that produce can be handled and transported before the next rains set in.

³ This refers to producers who cannot compete on world markets without subsidies and does not mean that the farmers are technically inefficient, given available resources.

Maize stocks perform a dual purpose: they provide a working stock for annual requirements and a reserve for periods of deficit. The rainfall pattern in Zimbabwe is capricious and highly seasonal, occurring mainly between November and March. Agricultural potential is distributed according to average rainfall variations and temperature differences, as depicted by the country's five natural regions. Total rainfall and its distribution during the season are the overriding limiting factors for agricultural production (Table 2).

Taking a three-year average (1985-1987), 83% of all maize marketed and 95% of maize marketed by the commercial farming sector came from Natural Region (NR) II. Although only 8% of the communal lands are in NR II, they contributed 67% of marketed maize in the period, rising to 85% in 1987 which was a drought year. The contribution to maize marketing by communal and small-scale farmers fell between 1985 and 1987, but the contribution from those farmers in NR II rose steadily (Table 3).

Zimbabwe has experienced extreme variability of rainfall in the years following independence. Rainfall was higher than normal throughout most of the country during the 1980-81 and 1984-85 cropping seasons, which produced bumper harvests and losses on exports. A widespread successive drought occurred for three seasons between 1981-82 and 1983-84 causing severe food shortages, especially in calendar year 1984. There was drought again in 1986-87. Yield variability has been estimated by the GMB for both communal and commercial production (Table 4).

The above analysis, notwithstanding the limitations of using aggregated data over a brief period, has served to highlight the susceptibility of maize production to seasonal variations in yields, especially in the communal sector. Seasonability is further aggravated by the unreliability of NR III, IV and V as sources of regular marketable maize surpluses.

The relationship between seasonality and food security

Wide fluctuations in production and marketing have simply added to the government's difficulty in stabilising domestic food prices, controlling storage costs, and has resulted in stock management problems. Fluctuations in GMB intakes, sales, and reserve stocks are shown in Table 5.

The proponents of on-farm storage have shown that decentralised storage is cheaper than centralised storage under certain circumstances. Given the circumstances in Zimbabwe, however, it would appear that the economies of size of centralised storage may outweigh the benefits of on-farm storage, particularly in view of the fact that all home consumption is already stored in the communal areas and it is only the marketed surplus for deficit and urban areas and for export which is centrally stored.

The impact of pan-seasonal prices on delivery patterns

Grain marketing tends to vary considerably more than production, especially in the communal sector where a significant share of food production is consumed directly by the farm household. In drought years, net marketings and deliveries to the GMB decline proportionately more than production.

Table 2. Distribution of agricultural land by natural region, Zimbabwe.

Natural Region	Average annual rainfall (mm)	Large-scale commercial (%)	Small-scale commercial (%)	Communal farmers (%)	Resettlement farmers (%)
I	> 1000	3	0	1	2
II	750-1000	30	18	8	20
III	650-1000	16	38	17	37
IV	450-650	23	37	45	38
V	< 450	28	7	29	3
		100	100	100	100

Table 3. Marketing surplus of maize by natural region and by farming sector, Zimbabwe, 1985 to 1987.

Contribution of NR II to:	1985	1986	1987
Total sales (%)	80	86	91
Commercial sector sales (%)	95	95	95
Communal sector sales (%)	61	72	85

Table 4. Yield variability in maize production, Zimbabwe, 1980-88

	Commercial area (mt/ha)	Commercial area (mt/ha)
Mean	4.60	0.90
Standard deviation	1.06	0.45
High	5.97	1.71
Low	2.58	0.29

The persistent instability in production means that to achieve maize self-sufficiency objectives, the country has relied heavily on large reserve stocks being held by the GMB. The main rationale for self-sufficiency includes a consumer preference for white maize which is usually only available from South Africa. In addition, the high bridging costs and foreign currency constraints make imports undesirable. Large centralised storage facilities are necessary in order to maintain the required strategic reserve of some 1 million mt (or 1 year's consumption). Keeping such large stocks is expensive (Buccola and Sukume, 1988), but is considered the price of national food self-sufficiency.

Table 5. Maize stocks purchases and sales ('000 t), Zimbabwe 1980-81 to 1986-87.

Marketing year	Opening stock	Local purchases	Local sales	Exports (imports)	Shrinkage	Closing stock
1980-81	64.8	814.8	716.1	2.9 ^a	2.7	157.9
1981-82	157.9	2,013.8	664.9	305.1	1.1	1,200.7
1982-83	1,200.7	1,391.3	1,046.2	492.0	18.6	1,035.1
1983-84	1,035.1	616.9	1,273.2	252.3	3.8	122.7
1984-85	123.0	942.0	860.0	(269.0)	12.0	462.0
1985-86	462.0	1,828.0	560.0	285.0	13.0	1,432.0
1986-87	1,432.0	1,594.4	713.3	494.5	12.3	1,806.3

^aIn the 1980-81 marketing year, 86.3 mt were exported and 83.4 mt were imported.

Source: Grain Marketing Board, (1988).

Similarly, in good years the percentage increase in marketing is usually substantially larger than the percentage increase in production (Stanning, 1987). Stanning's study noted that small farmers have multiple objectives in producing grain, but concluded that meeting food requirements takes priority over other production goals.

Grain retentions are dictated by farmers' consumption and sales habits. In general, storing grain for household receives priority. In addition, most farmers regard it as important to have in store more than they consume during the year in case of a bad harvest and also to retain some grain for nonfood purposes such as labour payment, exchange, and beer brewing (Stanning, 1987, p.38).

This study showed that in surplus areas, most maize was sold in a single sale two to three months after harvest and that only 10% of the population exhausted home grain supplies before the next harvest. Local purchases and labour exchanges made up most of the deficit. Although GMB has pan-seasonal prices, local prices do vary but "farmer behaviour in Urungwe and Bushu implies that the costs of storage (losses due to insects and rodents, outlays on buildings), outweighs the benefits of storage" (*ibid*, p.52).

Although the exact timing of maize sales varies from year-to-year depending on seasonal rainfall patterns, conditions at harvest, and availability of transport; the need for ready cash is a major factor affecting timing. For many small farmers, crop sales are the main source of cash and, therefore, timing of sales is closely related to cash needs. The decisions are unlikely to be affected by incentives offered to encourage storage for sales later in the year. Large-scale farmers would be in a better position to take advantage of price variations, but this would have a major impact on traditional short-term financing.

Introducing price variations to encourage on-farm storage will thus have a very limited impact since peasant farmers do not rely on central government to store their maize for home consumption--a significant proportion of national production is already stored for one season on farms (only 30% of total estimated production in

the small farm sector was marketed in 1985, some 45% of total GMB intake). Early sale of that proportion which is marketed is likely to continue, even with fairly considerable price incentives for on-farm storage.

Intraseasonal price variations will, therefore, only affect the large-scale sector. If it were in the national interest to stagger deliveries to the GMB, this sector would respond--provided the incentives were sufficient to cover cost of storage facilities, interest on investment, spoilage risk, and the interest on extended financing of variable inputs. Transport currently staggers deliveries to some extent, but all maize is usually delivered by August; whereas the peasant sector, which has poorer access to transport, continues to deliver much later. The potential moisture spoilage effect from large deliveries after the rains have commenced needs to be considered before any incentives are offered for deliveries after October. In years when buffer stocks are low, price incentives have been offered for early delivery in April and May. These incentives have effectively been available to the large-scale sector only because of the throughput necessary to warrant investment in artificial drying facilities.

The administrative costs of estimating the necessary variations to elicit desired response are high in countries where reliable forecasting models and data do not exist. Thus, it would only be worthwhile if the social costs of pan-seasonal prices are likely to be considerable. This is unlikely, given that they affect intra rather than interseasonal storage and given the existing storage infrastructure in Zimbabwe. In most years the GMB prefers to take delivery of the grain as soon as possible after harvest so that it can plan effectively and negotiate export or import contracts as appropriate.

Pan-territorial pricing

Pan-territorial pricing refers to the uniform depot price paid throughout Zimbabwe. Farmers bear the cost of transport to depots, but the marketing parastatals bear all transport costs ex depot to zone centres. Millers, processors, and food aid organisations bear costs of transport from zone centres. There is a uniform selling price ex zone centre and the retail price of maize meal is controlled throughout the country with an insignificant margin allowed for transport. This results in shortages in rural areas during deficit years (Child, Muir, and Blackie, 1985) and loss-leader or conditional sales when maize is available. This paper, however, concentrates on pan-territorial producer prices and does not consider the impacts of uniform selling prices.

Uniform depot prices mean that farmers in the more remote surplus regions are being subsidised by farmers in deficit regions and by farmers closer to markets. Pan-territorial prices are defended on the basis that they increase returns to the more isolated areas and thus increase equity. In addition, they are easier to administer and appear, superficially, to be more equitable since all farmers are paid the same price. The fact that incomes are equal to price times yield appears to be ignored.

Economists agree that uniform prices have a negative impact on economic efficiency and thus growth⁴. Uniform prices are usually supported on equity grounds. The thesis of this paper is that pan-territorial prices have a negative impact on both growth and equity. Uniform prices infer an implicit transport subsidy which distorts resource allocation by encouraging the production of low-value, high-bulk commodities in remote regions. This increases demand on an already over-burdened transport sector. Deficit regions receive a producer price very much lower than those which would obtain under a free-market system (see Figure 1), thus reducing incomes in these areas and increasing the transport burden. To the extent that the poor are maize producers living in deficit areas, there is a negative impact on equity.⁵

Theoretical impacts on growth

Uniform prices ignore transport costs, thus distorting comparative advantage and resulting in the misallocation of resources. The extent to which resources are misallocated depends on the development level of the transport infrastructure and the distance from markets. Producers close to market have an absolute advantage in the production of all commodities (assuming similar agronomic conditions), but producers further from the market have a comparative advantage in the low-bulk, high-value commodities. This is because the transport cost is a smaller proportion of the value to weight ratio (e.g., transport costs are 6% of sorghum price and only 1.5% of groundnut price).

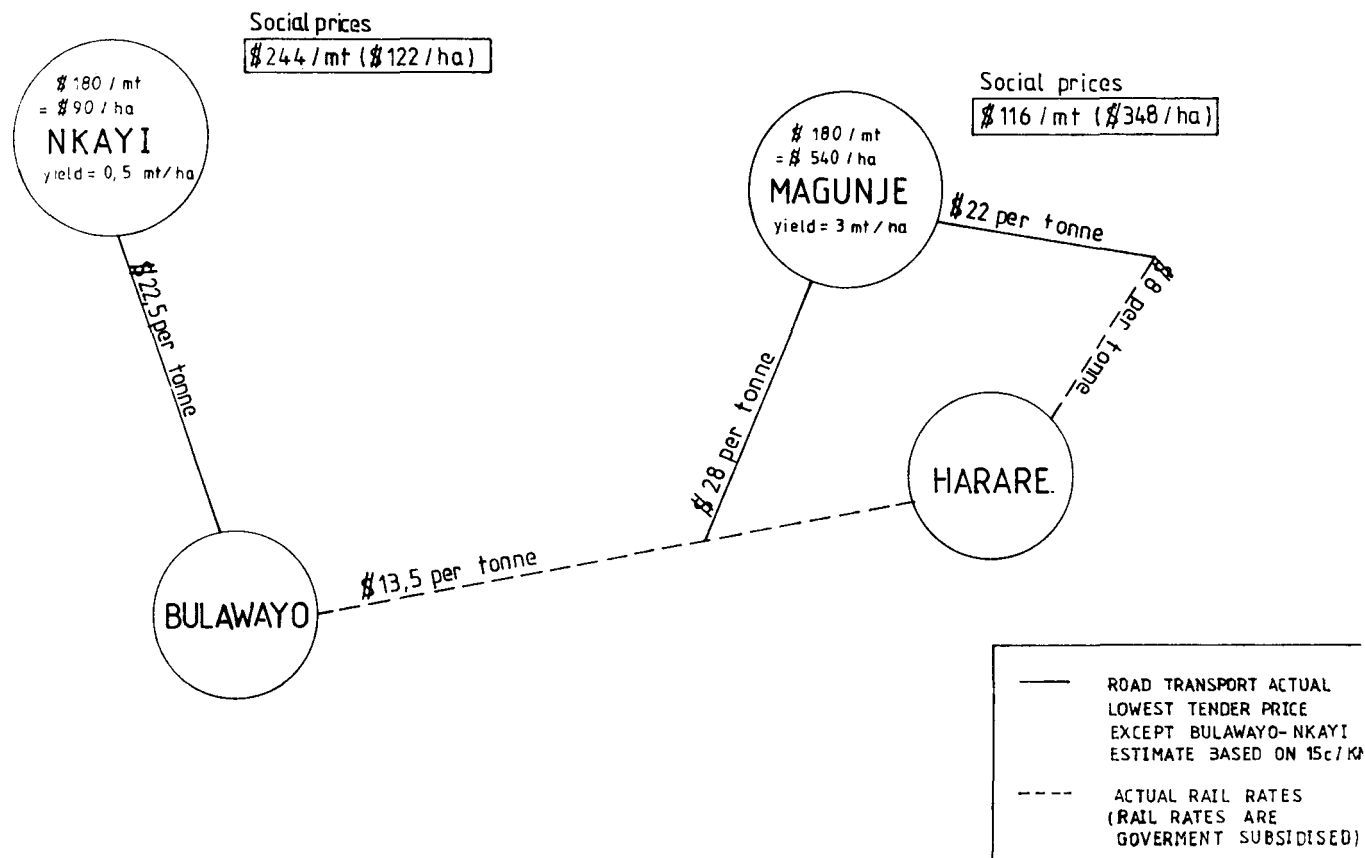
If producer prices ignore transport costs, then they are encouraging remote regions to grow high-bulk, low-value commodities while producers close to the market are discouraged by the implicit tax. Producers in deficit areas would produce more if prices were higher, but with a uniform price they do not receive the necessary incentive which means that greater imports to the area are necessary. These distortions place an excessive burden on the transport system; increasing the demand for transport and thus foreign currency. Where the foreign exchange component of transport is estimated at some 70%, the distortion is even greater if opportunity cost pricing is used. It is not possible to estimate the actual impact on the transport sector since it is difficult to estimate the reduction in production in remote surplus areas and the increase in deficit regions or in areas close to the market, without reasonably accurate price elasticities of supply.

⁴ Agronomists usually prefer to see higher prices in agronomically suitable zones in the interests of higher national average yields. This would only be economically rational if there was no demand for that commodity in deficit areas.

⁵ Where the poor are involved in purchasing maize, those in surplus areas are negatively affected by uniform prices. Theoretically, net maize purchasers in deficit areas benefit from uniform prices which keep producer prices low. In fact, in deficit areas local sales are made well above the government established price (e.g., In Chivu in 1988, maize was selling for three times the GMB purchase price). To some extent, this informal trading offsets the distortions within those areas of the uniform price policy.

FIGURE 1

EXAMPLE OF PAN-TERRITORIAL PRICE DISTORTIONS



The production of higher-value crops is reduced, thus reducing agricultural output, GNP, and growth. In many instances, these higher value crops play an important role in saving or earning foreign currency, thus furthering the negative impact of uniform prices on the supply of foreign currency. The most important constraint to growth in Zimbabwe is access to foreign currency.

Theoretical impacts on equity

Pan-territorial prices are defended on equity grounds, since it is assumed that incomes will be less differentiated if farmers in remote regions are paid the same prices as farmers close to markets. This ignores the price differentials which would exist for surplus and deficit areas. It would hold true only if all farmers were endowed with the same natural resources, abilities, and tastes. Given differences, there are regions where maize would be surplus to local requirements and these surpluses sold to urban areas and deficit regions. In a free market, prices would reflect the transport costs of either "importing" or "exporting" a commodity. These social prices are given in blocks on the diagram (Figure 1).

Producer prices would be higher in deficit areas, thus increasing incomes. Where people in remote surplus areas have higher total incomes (subsistence and cash) than those in deficit areas, the pan-territorial prices will have a negative impact on equity. At the same time, where wealthy, surplus farmers are located close to distribution centres, the uniform prices implicitly tax these farmers in favour of remote surplus producers. In these circumstances equity may be promoted. In Zimbabwe most of the direct transfer is between taxpayers and remote surplus farmers with most of the implicit transfers being between deficit area and surplus area farmers. The actual impact of pan-territorial prices on equity can only be determined empirically.

Theoretical impacts on food self-sufficiency and employment

National self-sufficiency may be achieved by subsidising transport in remote surplus regions, thus encouraging greater maize production and sales to the marketing board. Regional or district self-sufficiency is, however, very much lower with pan-territorial prices. It has been shown that regional differentials reflecting comparative advantage would result in higher producer prices in deficit areas. Local prices would reflect the cost of transporting the maize from surplus areas. Producers in deficit areas would be offered higher prices, which would encourage local production. Local production (self-sufficiency) of maize in deficit areas is economic, up to the point where it becomes cheaper to import from surplus areas. Thus, despite poor agronomic conditions which result in lower yields and higher risks, if the demand for maize is high then it pays farmers in a marginal region to grow maize, provided they can produce the maize at a price no more than the cost of purchasing and transporting it from a surplus area. This is in direct contradiction to the advice given by many agriculturalists who prefer to see production directed by criteria governing supply alone. Demand, however, is equally important in determining both comparative advantage and equilibrium prices which in turn affect local food self-sufficiency.

Uniform prices distort production patterns by encouraging high-bulk, low-value commodities in remote areas. If the commodities which are discouraged are more labour-intensive, then pan-territorial prices have a negative impact on employment. In Zimbabwe these commodities (tobacco, groundnuts, cotton) are all labour-intensive.

Experience from Tanzania and Zambia

Efforts were made in Zambia after independence to introduce regional pricing for maize so that surplus areas received a lower price and deficit regions a higher price. However, in 1970-71, however, uniform district prices were introduced and in 1974 uniform local depot prices were established. Although designed to increase equity, the policy increased rural differentiation and implicitly taxed Western Province farmers (the poorest in Zambia). The increased transport requirements have contributed to the large losses incurred by NAMBOARD and the marketing cooperatives (Dodge, 1977).

In Tanzania prior to 1975, only the transport costs from regional centres to distribution centres were subsidised. When the cooperative societies were abolished in favour of state marketing boards, the villages themselves served as procurement points--introducing a significant transport subsidy to the more remote regions and villages. The transport of maize from the southwest cost Tsh40 million in 1980, whereas sales of the same maize generated less than Tsh 36 million (Keeler *et al.*, 1982). Ndulu (1980), in a simulated study of the situation in four regions, convincingly showed that in 1975-76 and 1976-77, without the interregional transport subsidy policy implied by uniform prices, supplies of maize would have been greater. As the response would have come from low transport-cost regions, there would have been a net social saving. The government introduced regional pricing differentials for maize in 1981, but instead of lowering producer prices in remote surplus regions they have increased them. This is directly contrary to the principle of efficiency pricing and exaggerated the misallocation of resources. It was done in order to discourage maize production in the drier regions which are subject to crop failures and, although unstated, is because the more remote areas have a much higher official price elasticity since the high transport costs do not make parallel markets worthwhile. Suzuki and Bernard (1987) maintain that while the policy resulted in "huge financial deficits" the opportunity costs of growing high-bulk maize in the southern highlands (and thus resource misallocation) is low because of the problems which are associated with growing tobacco, assumed to be the only alternative crop. They also assume that poorer people are located in the southern highlands. Therefore, the authors maintain that the dramatic spatial swing in maize production accords with both growth and equity in Tanzania. Even if these assumptions are valid, there is insufficient evidence presented to prove that the policy accords with either growth or equity.

Evidence from Zimbabwe

When Zimbabwe moved away from regional prices to the use of average uniform into-depot prices, the "intent was for consumers in production areas to subsidize

those in deficit areas, while at the same time encouraging production in areas more suitable for maize production by giving them a higher effective return than to producers in marginal areas" (GMB, 1987). This is extremely inequitable since incomes are related to price times yield. Therefore, it is unfair to pay farmers who receive half a tonne per hectare the same as those who receive five tonnes per hectare, in the name of equity. In general, areas with an absolute agronomic advantage in producing a particular commodity (high yield areas) will continue to be the major producers. However, any policy which pays farmers in deficit areas less than the price of purchasing and transporting that maize from the surplus areas will reduce both growth and equity. The only instance in which it makes sense to pay farmers in high-yielding zones more than those in low-yielding zones is if the commodity has no demand in the low-yielding zone. In a free market, the situation would not arise since a low demand would mean that the price would not be high enough to result in production when yields are low.

Maize is widely grown and is the staple food in all farm communities, but 91% all marketed output in 1987 came from NR II. Almost all the farmers outside this area are penalised by the uniform price system. Despite a considerably smaller urban population, sales from Bulawayo exceeded those from Harare in 1986 and were only slightly lower in 1987. This indicates the much greater demand from the rural and smaller urban centres in that region.

Transport is a major factor in GMB deficits and, in particular, to the very considerable deficits on the maize account. The removal of pan-territorial pricing would significantly reduce this deficit.

An empirical example is presented below, using data for Magunje in Mashonaland West and Nkayi in Matabeleland North to indicate the consequences of the uniform into-depot prices (pan-territorial) in Zimbabwe. In 1987⁶ 20,000 mt of maize were transferred from Magunje to Bulawayo (Table 6). The example uses actual transport costs shown in Figure 1.

Equity impact

Under the uniform price system of Z\$180/mt, the gross revenue in Magunje is Z\$540/ha, whereas it is Z\$90/ha for Nkayi. Assuming that people in Nkayi are poorer than those in Magunje, this does not accord with equity. A regional price differential reflecting transport to or from Bulawayo, would mean a price of Z\$138.50/mt in Magunje and Z\$244/mt in Nkayi. This will still leave farmers in the better agronomic zones with higher returns, but it would reduce the differential since Magunje farmers would now get Z\$415.5/ha and Nkayi farmers Z\$122/ha. Figure 1 shows the impact if Magunje farmers pay the full costs of transport to Nkayi.

⁶The harvest year, which represents the 1986-87 growing year and the 1987-88 marketing year.

Table 6. Illustrative impact of pan-territorial and regional prices in two areas of Zimbabwe, 1987.

	Magunje (NR II)	Nkayi (NR IV)
GMB		
Total intake (mt)	28,900	1,500
Amount distributed	20,000 ^a	local only ^b
Grain price (Z\$/mt) under:		
Uniform pricing	180.00	180.00
Regional pricing	138.50 ^c	244.00 ^d
Yield (mt/ha)	3.0	0.5
Gross returns (Z\$/ha) under:		
Uniform pricing ^e	540.00	90.00
Regional pricing ^f	415.50	122.00
Value of grain (Z\$):		
Uniform pricing ^g	3,600,000	270,000
Regional pricing ^h	2,770,000	366,000
Impactⁱ		
GMB (Z\$) ^{jk}	loss -830,000	gain 96,000
Social losses (Z\$) ^{lm}	loss -1,411,000	loss -765,000
Farmer (Z\$/mt) ⁿ	subsidy 41.50	subsidy -64.00

^aTransferred from Magunje to Bulawayo.

^bNo grain transferred out of depot.

^cComputed as uniform price minus transport cost.

^dComputed as uniform price plus transport cost.

^eComputed as yield times uniform price.

^fComputed as yield times regional price.

^gComputed as uniform price times amount distributed for Magunje; and uniform price times total intake for Nkayi.

^hComputed as regional price times amount distributed for Magunje; and regional price times total intake for Nkayi.

ⁱDepot to destination route is Magunje to Bulawayo, and Nkayi from Bulawayo which assumes Nkayi is a deficit area importing from Bulawayo.

^jExcludes supply response to price which would result in higher GMB and social losses from uniform prices.

^kGMB losses are the costs to the GMB of paying uniform prices for maize.

^lOnly includes opportunity cost of foreign currency in transport (assuming 70% foreign content worth more by a factor of 2). A very crude estimate that makes the unlikely assumption that with regional pricing, deficit areas become self-sufficient. However, the resource misallocation impact on commodity and input mixes is not included in the estimate.

^mSocial losses are the cost to the nation due to transport distortions.

ⁿFarmer cost is the implicit transport tax/subsidy or the difference between what the farmer would get if regional prices were introduced, using actual costs of transport from Magunje to Bulawayo and Z\$0.15/km/mt to Nkayi.

Source: GMB tenders and personal communications.

Fiscal impact

GMB currently absorb all the transport costs from depot to various zone centres. The Z\$830,000 implicit loss to government from uniform prices on the 20,000 mt transferred from Magunje assumes that if regional pricing were introduced, farmers would bear transport costs and that these areas would continue to be major suppliers.

Crude estimates of actual fiscal losses from the uniform price policy can be made. Assume that 80% of Bulawayo supplies currently come from the maize surplus regions, but that this drops to 60% after regional pricing is introduced; savings on Bulawayo maize sales from the introduction of regional producer pricing would have been approximately Z\$8 million in 1987. This figure cannot be accurately estimated without price elasticities of supply in the different regions.

Efficiency (growth) impact

It would be useful to calculate the net savings to the nation from reduced transport demand and better resource allocation. Given some very rough estimations and limiting assumptions, the social costs of uniform prices--with respect to Bulawayo in 1987--were in the region of Z\$40 million.

This assumes that there would be a 50% reduction in the surplus production from remote areas (159,000 mt) and an equivalent increase from the Bulawayo region resulting in a Z\$10 million saving on transport with foreign currency component and shadow rate as given above. It assumes that 50% of the reduced maize comes from remote commercial farms (13,250 ha) and is replaced by tobacco and fallow, while the other 50% comes from communal and resettled farmers (26,500 ha) and is replaced by cotton and groundnuts. Using social profitability per hectare from O'Driscoll and Takavarasha(1988), the opportunity cost of the pan-territorial maize price on resource allocation is calculated using the formula: area planted to new crop(s) times social return per hectare less social value of replaced maize (see Appendix 1).

Basic supply response studies for the commercial sector do exist and more accurate estimates of response in that sector are possible, but there is very little information available for the communal sector. The calculations in Appendix 1 are used for illustrative purposes only.

Similar calculations could be made for the impact on employment and food self-sufficiency. It is obvious from the evidence presented that uniform into-depot prices are inimical to growth and that with respect to producers in deficit areas, inimical to equity. The impact of transfers between surplus producers remote from and close to markets and between deficit area and surplus area consumers have not been estimated.

POLICY RECOMMENDATIONS

Partial decontrol of the market would reduce the inefficiencies arising from costs of production, pan-seasonal and pan-territorial pricing. Government could continue to both stabilise prices and maintain buffer stocks to achieve food self-sufficiency.

Although there would still be costs associated with maize self-sufficiency, these would be reduced as the government would purchase when prices were low and sell when they are high. Producers would be assured of a minimum price which covers variable costs and consumers would be protected from exorbitant price rises in drought years (Child, Muir, and Blackie, 1985).

Where governments prefer to continue with full state control, the negative consequences for growth, equity, and employment can be reduced by institutionalising economic analysis of policy impacts. It is possible to reduce pricing inefficiencies, or at least measure the cost and, therefore, make informed decisions. Another suggestion is that marketing parastatals should be allowed to distinguish in their cost accounting between commercial functions and those which are social operations undertaken on behalf of government—strategic grain reserves and low food prices for consumers (Coopers & Lybrand, 1988). To do this, opportunity cost prices for both producers and consumers must be established.

A preliminary analysis of the efficiency impact of different price policies has been carried out by O'Driscoll and Takavarasha (1988), showing where current prices for outputs and inputs differ from social prices. An investigation of the comparative advantage of wheat (Morris, 1988) also includes some domestic resource cost (DRC) analysis of other irrigated crops. It is recommended that such analysis is institutionalised and that a major preliminary study be undertaken to determine comparative advantage for the various regions and farming systems.

Domestic resource cost ratios (DRCs) are a measure of the local resources required to earn or save one unit of foreign currency. The policy analysis matrix, used to determine a DRC, provides a good framework for analysing policies. The impacts of government policies can be measured in efficiency terms; and the results can indicate which commodities should be promoted to maximize growth. At the same time, if policymakers decide to vary prices to achieve other objectives (*e.g.*, equity, food self-sufficiency employment, or soil conservation), to the extent that there is a trade-off with growth, it can be measured. DRC analysis measures comparative advantage and will reflect well for those commodities and technologies which rely on Zimbabwe's abundant resources in the production process. It is unlikely that any one DRC study will produce precisely the same results as another study, since they depend on the data used and social price estimates. It is, however, the relative results which are important since these will signal which commodities have the greatest comparative advantage in saving or earning foreign currency.

It is further recommended that border prices, adjusted to reflect the value of foreign exchange, be used as the basis for setting price for all commodities except maize. These prices can then be modified in response to lobbies or to achieve other goals and the impacts can be measured. It is difficult to decide whether to use export or import parity for maize. This presents a particular problem since the high bridging costs result in severe losses, both for exports and imports. A number of suggestions have been made which amount to setting the price half way between world export and import parity (Muir-Leresche, 1984) or at regional export parity (O'Driscoll and Takavarasha, 1988).

While pan-seasonal prices for maize do have some impact on parastatal deficits and partial decontrol will reduce these, the impact is minor compared to the cost of the reserve stocks necessary to reduce interseasonal fluctuations. From the social welfare perspective, it is uncertain that on-farm storage would be cheaper than centralised storage with its greater economies of size. Peasant farmers already store grains used for all home consumption during the year and usually prefer to sell any marketable surplus as soon as possible. The administrative costs of setting the prices at the correct levels to induce the desired on-farm storage of marketable surpluses would be considerable and the returns are unlikely to warrant their establishment at this stage. As the peasant sector becomes more specialised and more closely integrated in the market, this may change. Preparation can be made for this development by building the capacity to establish reasonably accurate supply and demand elasticities.

Pan-territorial pricing, on the other hand, has a major impact on both the marketing board deficits and the economy with negative impacts on both growth and equity. Where central government finances all transport costs, all surplus farmers benefit and farmers in remote surplus areas gain the most. To the extent that they are poorer, this will accord with equity but at an enormous social cost as previously demonstrated. Uniform prices act as an implicit tax on deficit area farmers, suppressing their locational advantages. Thus, uniform prices are contrary to both growth and equity, where these farmers are poorer than farmers in surplus areas. The authors strongly recommend that government introduce regional producer prices for maize which more closely approximate opportunity costs.

While it would be difficult to establish regional prices which exactly reflect opportunity costs, it is possible to set prices which take into account some of the transport costs. In the first instance, this could be done by establishing prices at surplus area depots which reflect transport costs to the nearest zone centre (*i.e.*, NRII/III farmers would bear the cost of transport to Harare or Mutare. GMB would still bear the additional cost of transport to deficit areas. Using the example in Figure 1, Magunje farmers would be paid Z\$150/mt using this formula. Theoretically, the price should reflect transport costs to the main deficit region (Bulawayo), but initially it may be politically difficult to make such a sharp differential. If surplus production and exports continue to make losses, removing more of this subsidy should then be considered.

Deficit area farmers, however, should be paid the full cost of transporting the maize from surplus areas. Thus, they should be paid the f.o.r. Harare price plus transport from Harare. Given the low yields in these areas, it is unlikely that they will significantly increase output. But they should be encouraged to be self-sufficient up to the point where it becomes cheaper to import from other regions.

It is also considerably fairer—given that income is equal to price times yield—to pay farmers in low-yielding areas more than those in high-yielding areas. It would be expensive to growth to pay them more than the opportunity cost of importing maize from surplus areas, but it is inimical to both growth and equity to pay them less. Theoretically, they should be paid the depot price plus transport costs from the furthest surplus region and it may be possible to do this. At a minimum, they should

be paid the depot price plus transport costs from Harare. The calculation of these transport rates should not reflect the subsidised rail rates which the earlier analysis does. Thus, the deficit area price would be higher than that reflected in the example.

CONCLUSION

It is possible for governments to considerably increase the efficiency of marketing parastatals without changing their structure. While a number of specified goals may take precedence over growth and foreign currency earnings, it is important for policymakers to be aware of the impacts of any policies designed to achieve these goals and to choose the least-cost path. Financial and economic values differ. Whenever possible, it is important that price signals maximise social welfare through rational resource allocation. Implicit taxes or subsidies do not imply that farmers are making losses or excessive profits, but that they are being paid too little or too much to ensure the best possible choice of outputs and inputs. This movement away from economically optimum resource allocation may be necessary to achieve other goals. Therefore, it may be desirable to subsidise farmers by paying prices above world prices. On the other hand, some policies (e.g. uniform prices) are highly distortive and a way to implement regional prices which more closely approximate opportunity cost should be found.

REFERENCES

- Buccola, S. and C. Sukume. 1988. Optimal grain pricing and storage policy in controlled agricultural economies: application to Zimbabwe. *World Development* Vol. 16:3, pp. 361-371.
- Child, B., K. Muir, and M. Blackie. 1985. An improved maize marketing system for African countries: the case of Zimbabwe. *Food Policy*, November.
- Chavanduka, G. (Chairman). 1983. *Report of the commission of inquiry into the agricultural industry*. Government Printer, Harare.
- Coopers & Lybrand Associates. 1988. Efficiency study of grain marketing board. Grain Marketing Board, Harare.
- Dodge, D. (Jansen). 1977. *Agricultural policy and performance in Zambia*. Institute of International Studies, University of California, Berkeley.
- Grain Marketing Board. 1987. Corporate planning seminar. Nyanga, Zimbabwe.
- , 1988. Draft report & accounts for year ended March, 1988. GMB, Harare.

- Herbst J. 1988. Societal demands and government choices: agricultural producer price policy in Zimbabwe. *Comparative Politics*. pp. 265-287. April.
- Keeler, A., M. Scobie, M. Renkox, and D. Franklin. 1982. The consumption effects of agricultural policies in Tanzania. (mimeo). Prepared for USAID, Dar es Salaam.
- Morris, M.L. 1988. Wheat policy options in Zimbabwe: a comparative advantage approach. In: M. Rukuni and R.H. Bernstein (eds.) *Southern Africa: food security policy options*. UZ/MSU Food Security Project, Department of Agricultural Economics and Extension, University of Zimbabwe, Harare.
- Muir-Leresche, K. 1984. Crop price and wage policy in the light of Zimbabwe's development goals. Unpublished Ph.D dissertation, Department of Land Management, University of Zimbabwe, Harare.
- Muir, K. and M.Blackie. 1988. *Maize price cycles in East and Southern Africa*. Working Paper AE 6/88. Department of Agricultural Economics and Extension, University of Zimbabwe, Harare.
- Ndulu, B. 1980. *The impacts of inter-regional transport subsidy policy on commercial supply of food grains in Tanzania: the case of paddy and maize*. Economic Research Bureau Paper 80.1. University of Dar es Salaam.
- O'Driscoll, A and T. Takavarasha. 1988. *Crop price policy analysis*. Working Paper AEE 5/88. Department of Agricultural Economics and Extension, University of Zimbabwe, Harare.
- Stanning, J. 1987. *Household grain storage and marketing decisions in surplus and deficit communal farming areas in Zimbabwe: preliminary findings*. Working Paper AEE 1/87. Department of Agricultural Economics and Extension, University of Zimbabwe, Zimbabwe.
- Suzuki, Y. and A. Bernard. 1987. *Effects of pan-territorial pricing policy for maize in Tanzania*. IFPRI, Washington, D.C.
- Takavarasha, T. 1986. Institutionalising agricultural price policy in Zimbabwe. D.Phil proposal. Department of Agricultural Economics and Extension. University of Zimbabwe, Harare.
- Theunissen, E.T. 1988. A national maize stock policy for Zimbabwe. Unpublished Working Paper. GMB, Harare.

Wright, N. and T. Takavarasha. 1989. *A historical review of agricultural price policy in Zimbabwe* (forthcoming). Working Paper. Department of Agricultural Economics and Extension, University of Zimbabwe, Harare.

Zimbabwe Government. 1981. (ZIMCORD) Zimbabwe conference on reconstruction and development. Conference documentation. Ministry of Economic Planning and Development, Harare.

Appendix 1:

Assuming commercial farmers take 13,250 ha to produce 79,500 mt (6mt/ha) of maize; and they replace maize with 6,625 ha of tobacco (Z\$ 5,423/ha) and leave 6,625 ha fallow--the opportunity cost on commercial farms is computed as: Z\$35,927,375 added value of tobacco (6,625 ha tobacco x Z\$5,423/ha) minus Z\$9,672,500 (13,250 ha maize x Z\$730) in reduced maize value, for a net charge of Z\$26,254,875.

Assuming communal farmers take 26,500 ha to produce 79,500 mt (3mt/ha in NRII); and they replace the maize with 13,250 ha of cotton (Z\$422/ha) plus 13,250 ha of groundnuts (Z\$655/ha)--the opportunity cost on communal farms is computed as: the Z\$5,591,500 (13,250 ha cotton x Z\$ 422/ha) in added value of cotton, plus Z\$8,678,750 (13,250 ha groundnuts x Z\$655/ha) in added value of groundnuts, minus Z\$9,434,000 (26,500 ha maize x Z\$356/ha) in reduced value of maize, for a net charge of Z\$4,836,250. The commercial plus and communal opportunity cost is approximately Z\$31 million, plus Z\$10 million due to reduced transport costs, for a total opportunity cost of approximately Z\$41 million.

Note: The social returns/ha used in this analysis were calculated by O'Driscoll and Takavarasha (1988).



This work is licensed under a
Creative Commons
Attribution – NonCommercial - NoDerivs 3.0 License.

To view a copy of the license please see:
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This is a download from the BLDS Digital Library on OpenDocs
<http://opendocs.ids.ac.uk/opendocs/>